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## Claims:

1-21. CANCELLED.

22. (Previously Presented) A method for determining an instantaneous inspired volume of a subject during ventilatory assistance for use in a ventilator device comprising the steps of:

determining a measure of respiratory airflow of the patient;

calculating an index equal to the fuzzy extent to which a leak is changing based at least in part on the measure of respiratory airflow; and

calculating instantaneous inspired volume as a function of both the measure of respiratory airflow and said index.

23. (Previously Presented) The method of claim 22, in which said function is the time integral of the product of said index and the measure of respiratory airflow.

24. (Previously Presented) The method of claim 22 wherein said fuzzy extent to which a leak is changing is calculated as the fuzzy extent to which a measure of respiratory airflow is large for longer than expected.

25. (Previously Presented) The method of claim 22 wherein said fuzzy extent to which a leak is changing is a function of the fuzzy extent to which the leak has suddenly increased and the fuzzy extent to which the leak has suddenly decreased.

26. (Previously Presented) The method of claim 25 wherein the function is the fuzzy negation of a peak of a fuzzy union of said fuzzy extent to which the leak has suddenly increased and said fuzzy extent to which the leak has suddenly decreased.

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27. (Previously Presented) The method of claim 25 wherein said fuzzy extent to which the leak has suddenly increased is the fuzzy intersection of the fuzzy extent to which a measure of respiratory airflow has been positive for longer than expected and the fuzzy extent to which a measure of respiratory airflow is large and positive.

28. (Previously Presented) The method of claim 22 wherein said fuzzy extent to which the leak has suddenly decreased is the fuzzy intersection of the fuzzy extent to which a measure of respiratory airflow has been negative for longer than expected and the fuzzy extent to which a measure of respiratory airflow is large and negative.

29. (Previously Presented) A method for determining the instantaneous inspired volume of a subject during ventilatory assistance for use in a ventilator device comprising the steps of:

determining a measure of airflow from the subject;

calculating an index equal to the fuzzy extent to which the impedance of a leak is changing based at least in part on the measure of airflow; and

calculating instantaneous inspired volume as a function of both the measure of airflow and said index.

30. (Previously Presented) The method of claim 29, in which said function is the time integral of the product of said index and the measure of airflow.

31. (Previously Presented) An apparatus for determining a calculation of instantaneous inspired volume of a subject comprising:

a means for determining an estimate of the patient's respiratory airflow; and

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a means for calculating instantaneous inspired volume from said respiratory airflow;

wherein the means for calculating instantaneous inspired volume from said respiratory airflow includes coded machine control instructions to calculate said instantaneous inspired volume as a function of both the respiratory airflow and an index equal to the fuzzy extent to which a leak is changing.

32. (Previously Presented) The apparatus of claim 31 wherein said fuzzy extent to which a leak is changing is calculated as the fuzzy extent to which the respiratory airflow is large for longer than expected.

33. (Previously Presented) The apparatus of claim 31 wherein said function is the time integral of the product of said index and said respiratory airflow.

34. (Previously Presented) An apparatus for determining a calculation of an instantaneous inspired volume of a subject during pressure support assistance comprising:

a mask;

a blower to supply pressurized air to said mask;

a servo-controller coupled to said blower;

a transducer to generate a flow signal representing at least in part respiratory airflow; and

a processor, coupled to said transducer and said servo-controller, with programmed instructions;

wherein the instructions calculate instantaneous inspired volume as a function of both a measure of respiratory airflow from the flow signal and an index equal to the fuzzy extent to which a leak is changing.

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35. (Previously Presented) The apparatus of claim 34 wherein said fuzzy extent to which a leak is changing is calculated as the fuzzy extent to which the respiratory airflow is large for longer than expected.

36. (Previously Presented) The apparatus of claim 34 wherein said function is the time integral of the product of said index and said respiratory airflow.

37. (Previously Presented) The apparatus of claim 34 wherein said fuzzy extent to which a leak is changing is a function of the fuzzy extent to which the leak has suddenly increased and the fuzzy extent to which the leak has suddenly decreased.

38. (Previously Presented) An apparatus for determining a calculation of an instantaneous inspired volume of a subject during pressure support assistance comprising:

a mask;

a blower to supply pressurized air to said mask;

a servo-controller coupled to said blower;

a transducer to generate a flow signal; and

a processor, coupled to said transducer and said servo-controller,

wherein the processor is configured and adapted for calculating instantaneous inspired volume as a function of both data from the flow signal and an index equal to the fuzzy extent to which a leak is changing.

39. (Previously Presented) The apparatus of claim 38 wherein said fuzzy extent to which a leak is changing is calculated as the fuzzy extent to which data from the flow signal is large for longer than expected.

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40. (Previously Presented) The apparatus of claim 38 wherein said function is the time integral of the product of said index and said data from the flow signal.

41. (Previously Presented) The apparatus of claim 38 wherein said fuzzy extent to which a leak is changing is a function of the fuzzy extent to which the leak has suddenly increased and the fuzzy extent to which the leak has suddenly decreased.